Test Report for
EAC 2005 VVSG Certification Testing
Performed on Election Systems & Software Voting System 5.2.1.1

Issue Date: 06/14/2016

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REVISIONS

Revision	Reason for Revision	Date
NR	Initial Release	06/14/2016

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1.0 INTRODUCTION

Election Systems & Software (ES&S), herein referred to as manufacturer, submitted the Election Systems & Software Voting System 5.2.1.1 (EVS 5.2.1.1) to the Election Assistance Commission (EAC), for certification testing to the 2005 Voluntary Voting System Guidelines Standards (2005 VVSG). EVS 5.2.1.1 is a modification to the previously 2005 VVSG certified EVS 5.2.1.0 voting system (Certification number: ESSEVS5210), and as such, will be tested by National Technical Systems Huntsville (NTS Huntsville) based on the "modified system" requirements set forth in section 4.6.2.3 of the EAC Testing and Certification Program Manual, Version 2.0, herein referred to as the Program Manual.

1.1 Description of EAC Certified System Being Modified

The following subsection describes the EAC Certified System that is baseline for the submitted modification. All information was derived from the previous Certification Test Report and/or EAC Certificate of Conformance.

1.1.1 Baseline Certified System

EVS 5.2.1.0 is certified by the U.S. Election Assistance Commission to the 2005 Voluntary Voting System Guidelines (Certification number: ESSEVS5210). Tables 1-1 and 1-2 describe the hardware and software/firmware versions that were previously certified. For a complete description of the configuration and description of the EVS 5.2.1.0 product, refer to the EVS 5.2.1.0 Test Report located on the EAC's website at http://www.eac.gov.

Table 1-1. Previously Certified Software

Software	Software/Firmware Version
Proprietary Software	
Electionware	4.7.1.0
Election Reporting Manager (ERM)	8.12.1.0
Removable Media Services (RMS)	1.4.5.0
Event Log Services (ELS)	1.5.5.0
Proprietary Hardening Scripts	
CreateNewUser	3.0.3.0
NoNetwork	3.0.3.0
PreInstall	3.0.5.1
PostInstall	3.0.3.0
ServerShare	3.0.3.0
COTS Software	
Adobe Acrobat Standard	11
Cerberus FTP	6.0.7.1
Microsoft Server 2008 R2	2008 R2 w/ SP1
Microsoft Windows 7	7 w/ SP1
WSUS Microsoft Windows Offline Update Utility	8.8
Symantec Endpoint Protection	12.1.4
Symantec Endpoint Protection Intelligent Updater	20151006-037-v5i64.exe
Micro Focus RM/COBOL Runtime	12.06

1.1.1 Baseline Certified System (Continued)

Table 1-2. Previously Certified Voting System Equipment

Component	Hardware Version	Firmware Version
Proprietary Hardware		
ExpressVote Accessible Voting Station	1.0	1.4.1.0
DS200 Precinct Count Scanner	1.2.1, 1.2.3, & 1.3	2.12.1.0
DS850 Central Count Scanner	1.0	2.10.1.0
AutoMARK A100	1.0	1.8.6.0
AutoMARK A200 (SBC 2.0 & SBC 2.5)	1.1	1.8.6.0
AutoMARK A300 (SBC 2.0 & SBC 2.5)	1.3	1.8.6.0
Plastic Ballot Box	1.2 & 1.3	N/A
Metal Ballot Box	1.0, 1.1, & 1.2	N/A
COTS Hardware		
EMS Server – Dell	PowerEdge T710	N/A
EMS Reporting Workstation – Dell	Optiplex 980	N/A
EMS Reporting Laptop – Dell	E6410	N/A
Motorola QR Code Scanner	DS9208	N/A
Delkin USB Flash Drives	512MB, 1, 2, 4, & 8GB	N/A
Delkin Compact Flash	1GB	N/A
DS850 Report Printer	OKI B430dn & B 431dn	N/A
DS850 Audit Printer	OKI Microline 420	N/A
Avid Headphones	Avid FV 60	N/A
SanDisk CF Card Reader	018-6305	N/A

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1.2 References

- Election Assistance Commission 2005 Voluntary Voting System Guidelines, Volume I, Version 1.0, "Voting System Performance Guidelines," and Volume II, Version 1.0, "National Certification Testing Guidelines," dated December 2005
- Election Assistance Commission Testing and Certification Program Manual, Version 2.0, expiration date June 30, 2018
- Election Assistance Commission Voting System Test Laboratory Program Manual, Version 2.0, expiration date June 30, 2018
- National Voluntary Laboratory Accreditation Program NIST Handbook 150, 2006 Edition, "NVLAP Procedures and General Requirements (NIST Handbook 150)," dated February 2006
- National Voluntary Laboratory Accreditation Program NIST Handbook 150-22, 2008 Edition, "Voting System Testing (NIST Handbook 150-22)," dated May 2008
- United States 107th Congress Help America Vote Act (HAVA) of 2002 (Public Law 107-252), dated October 2002
- Test Guidelines Documents: EMI-001A, Test Guidelines for Performing Electromagnetic Interference (EMI) Testing," and EMI-002A, "Test Procedure for Testing and Documentation of Radiated and Conducted Emissions Performed on Commercial Products"
- NTS Quality Assurance Program Manual, Revision 8
- ANSI/ISO/IEC 17025:2005 and ANSI/NCSL Z540.3, "Calibration Laboratories and Measuring and Test Equipment, General Requirements"
- ISO 10012:2003, "Quality Assurance Requirements for Measuring Equipment"
- EAC Requests for Interpretation (RFI) (listed on www.eac.gov)
- EAC Notices of Clarification (NOC) (listed on www.eac.gov)
- EAC Quality Monitoring Program residing on:

  http://www.eac.gov/testing_and_certification/quality_monitoring_program.aspx
- NTS Test Report No. PR039745-01 Rev B – National Certification Test Report for Certification Testing of the Election Systems & Software EVS 5.2.1.0 Voting System
- ES&S EVS 5.2.1.0 Technical Data Package
- ES&S EVS 5.2.1.1 Technical Data Package

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1.3 Terms and Abbreviations

Table 1-3 defines all terms and abbreviations applicable to this Test Report.

Table 1-3. Terms and Abbreviations

Term	Abbreviation	Definition
Anomaly	--	Any non-repeatable testing event that is not the expected result or interrupts the test operations.
Americans with Disabilities Act 1990	ADA	ADA is a wide-ranging civil rights law that prohibits, under certain circumstances, discrimination based on disability.
Configuration Management	CM	Systems engineering process for establishing and maintaining consistency of a product's performance, functional and physical attributes with its requirements, design and operational information throughout its life
Commercial Off-the-Shelf	COTS	Commercial, readily available hardware or software.
Deficiency	--	Any repeatable test result that was not the expected result or violates a requirement of the 2005 VVSG.
United States Election Assistance Commission	EAC	Commission created per the Help America Vote Act of 2002, assigned the responsibility for setting voting system standards and providing for the voluntary testing and certification of voting systems.
ES&S Event Log Service	ELS	ES&S Event Log Service is a Windows Service that runs in the background of any active ES&S Election Management software application to monitor the proper functioning of the Windows Event Viewer
Election Management System	EMS	Within the voting system, the EMS is comprised of five components: Electionware, ERM, ES&S Event Log Service, VAT Previewer and ExpressVote Previewer.
Election Reporting Manager	ERM	EMS reporting component.
Election Systems and Software	ES&S	Identified vendor doting the equipment under test as part of this test plan.
Engineering Change Order	ECO	--
Equipment Under Test	EUT	Refers to the individual system component or multiple piece of the same component
ES&S Voting System	EVS	Proprietary equipment owned by ES&S
ES&S Export Utility	EXP	Export utility, part of ERM.
Functional Configuration Audit	FCA	Verification of system functions and combination of functions cited in the manufacturer's documentation.
Help America Vote Act	HAVA	Act created by United States Congress in 2002.
Institute of Electrical and Electronics Engineers	IEEE	--
Intelligent Mark Recognition	IMR	Visible light scanning technology to detect completed ballot targets.

1.3 Terms and Abbreviations (Continued)

Table 1-3. Terms and Abbreviations (Continued)

Term	Abbreviation	Definition
National Institute of Standards and Technology	NIST	Government organization created to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhances economic security and improves our quality of life.
Notice of Clarification	NOC	Provides further guidance and explanation on the requirements and procedures of the EAC's Voting System Certification or Voting System Testing Laboratory programs.
Personal Computer	PC	Computer component of the voting system.
Quality Assurance	QA	Administrative and procedural activities implemented as a way of preventing mistakes or defects.
Quantity	QTY	Number/Count of items
Quick Response Code	QR Code	Two-dimensional barcode
Request for Interpretation	RFI	A means by which a registered Manufacturer or Voting System Test Laboratory (VSTL) may seek clarification on a specific Voluntary Voting System Guidelines (VVSG) standard.
System Under Test	SUT	Refers to the system as a whole (all components)
Technical Data Package	TDP	Manufacturer documentation related to voting system required to be submitted as a precondition of testing.
Trusted Build	---	Final build of source code performed by a trusted source and overseen by the manufacturer which is delivered to the EAC designated repository; also referred to as a “Witness Build”.
Underwriters Laboratories Inc.	UL	Safety consulting and certification company
Uninterruptible Power Supply	UPS	Electrical apparatus providing emergency power when an input power source fails.
Voter Assist Terminal	VAT	Electronic ballot marking device component is the ES&S AutoMARK.
National Technical Systems, Inc.	NTS	Identified VSTL hosting the testing of the equipment listed in this test plan; facilities located in Huntsville, Alabama.
National Voluntary Laboratory Accreditation Program	NVLAP	Program which provides an unbiased third-party test and evaluation program to accredit laboratories in the respective fields to ISO 17025 standard.
NTS Operating Procedure	OP	NTS Test Method or Test Procedure.
Virtual Review Tool	VRT	Test campaign management software used by the EAC and vendors applying for qualification testing.
Voting System Test Laboratory	VSTL	NTS Huntsville
Voluntary Voting System Guidelines	VVSG	EAC Voluntary Voting System Guidelines Version 1.0.

2.0 CERTIFICATION TEST BACKGROUND

NTS Huntsville is an independent testing laboratory for systems and components under harsh environments, including dynamic and climatic extremes as well as the testing of electronic voting systems. NTS Huntsville holds the following accreditations:

- ISO-9001:2000
- NVLAP Accredited ISO 17025:2005
- EAC Accredited VSTL, NIST 150,150-22
- A2LA Accredited (Certification No.'s 0214.40, 0214.41, and 0214.42)
- FCC Approved Contractor Test Site (Part 15, 18)

2.1 Revision History

Table 2-1 describes the version history of the submitted voting system.

Table 2-1. Voting System Revision History

System Version	Certification Type	System Modified	Certification Date	Certification Number
EVS 5.0.0.0	New System	Original	05/16/2013	ESSEVS5000
EVS 5.2.0.0	Modification	EVS 5.0.0.0	07/02/2014	ESSEVS5200
EVS 5.2.1.0	Modification	EVS 5.2.0.0	12/15/2015	ESSEVS5210
EVS 5.2.1.1	Modification	EVS 5.2.1.0	TBD	ESSEVS5211

2.2 Known Field Issues

The EVS 5.2.0.0 voting system has two identified field issues.

- The RSA Crypto suite used by ElectionWare to generate RSA keys will sometimes create a key that is too short. This causes a key mismatch issue when loading the keys into ExpressVote. The issue was corrected in EVS 5.2.0.3 and the change was incorporated in this release.
- Intermittently the tree view indicator is not visible. In addition, sometimes list items, such as created media, do not appear or update in the list. These issues were corrected in this release.

2.3 Scope of Testing

The focus of the test campaign was to verify the modifications submitted by the manufacturer for EAC certification.

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2.3.1 Modification Overview

The changes submitted for this modification are presented in this section.

Operating System

- New windows offline updater package for Server 2008 R2 and Windows 7
- New offline anti-virus definition update package
- The PreInstall script was modified to change the following settings:
  - Server 2008 R2 and Windows 7:
    - Change made to allow storage of passwords and credentials for network authentication
    - Added additional Windows OS auditing.
    - Although Remote Desktop Services (RDS) is disabled through the registry the local group policy was modified to disable it as well
    - Registry change: Removed the Map and Disconnect Network Drive Options
  - Windows 7 only:
    - Users who logon with the local administrator account will not see elevation prompts on the secure desktop when opening programs that require administrator privileges.
    - Change made to prevent unsigned executables from being elevated.

ElectionWare

- The Multi Column function was added to display candidates in a two column view on the ExpressVote screen if there are more candidates than can fit in one column on a single page. When this occurs the ExpressVote will automatically display this data in two columns.
- The user can now validate the 'multi column view' selection in the Accessible Equipment Settings Report which can be verified in the Vote Session Properties section.
- In a prior EAC test campaign, a deficiency was identified where intermittently the tree expansion indicator (+) and equipment list did not function as expected (see section 2.3 for full details). A software change was made to correct the tree view expansion indicator (+) to ensure that it is viewable and to ensure that the Equipment List for each Poll updates correctly.
- When an XML file is generated in the Package module, users will notice that the file name changed from users2.0 XML to users3.0 XML. This change was required to support the new version of Cerberus. No changes were made to the file structure.

ExpressVote

- A software change was added to support the ability for a poll worker to scan a 128c barcode on the external barcode scanner in addition to manually selecting the ballot style on the touch screen.
- Modification was made to display candidates in either 1 or 2 columns in a particular contest screen based on a multi column configuration flag from Electionware.
- Copyright date updated to 2016

2.3.2 Test Materials

EVS 5.2.1.1 proprietary and COTS software submitted by the manufacturer for testing are listed in Table 2-2. Proprietary hardware and COTS are listed in Table 2-3.

Table 2-2. Required Voting System Software

Software	Software/Firmware Version
Proprietary Software	
ElectionWare	4.7.1.2
Election Reporting Manager (ERM)	8.12.1.0
Removable Media Service (RMS)	1.4.5.0
ES&S Event Log Service (ELS)	1.5.5.0
Proprietary Hardening Scripts	
CreateNewUser	3.0.3.0
NoNetwork	3.0.3.0
PreInstall	3.0.5.5
PostInstall	3.0.3.0
ServerShare	3.0.3.0
COTS Software	
Adobe Acrobat Standard	11
Cerberus FTP	8.0.0.9
Microsoft Server 2008	R2 w/ SP1
Microsoft Windows 7	7 w/ SP1
Symantec Endpoint Protection	12.1.6
Symantec Endpoint Protection Intelligent Updater	20160320-034-v5i64.exe
WSUS Microsoft Windows Offline Update Utility	10.6.1
WSUS Microsoft Patch	Windows 6.1 - KB3018238X64.msu
Micro Focus RM/COBOL Runtime	12.06

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2.3.2 Test Materials (Continued)

Table 2-3. Required Voting System Equipment

Component	Hardware Version	Firmware Version
Proprietary Hardware		
ExpressVote Accessible Voting Station	1.0	1.4.1.1
ExpressVote Rolling Kiosk	1.0	N/A
DS200 Precinct Count Scanner	1.2.1, 1.2.3, & 1.3	2.12.1.0
DS850 Central Count Scanner	1.0	2.10.1.0
AutoMARK A100	1.0	1.8.6.0
AutoMARK A200 (SBC 2.0 & SBC 2.5)	1.1	1.8.6.0
AutoMARK A300 (SBC 2.0 & SBC 2.5)	1.3	1.8.6.0
Plastic Ballot Box	1.2 & 1.3	N/A
Metal Ballot Box	1.0, 1.1, & 1.2	N/A
COTS Hardware		
EMS Server – Dell	PowerEdge T710	N/A
EMS Reporting Workstation – Dell	Optiplex 980	N/A
EMS Reporting Laptop – Dell	E6410	N/A
Zebra QR Code Scanner	DS457-SR20009	N/A
Delkin USB Flash Drives	512MB, 1, 2, 4, & 8GB	N/A
Delkin Compact Flash	1GB	N/A
DS850 Report Printer	OKI B430dn, B431dn, & B431d	N/A
DS850 Audit Printer	OKI Microline 420	N/A
Avid Headphones	Avid FV 60	N/A
SanDisk CF Card Reader	018-6305	N/A
Delkin CF Card Reader	6381	N/A

Test Materials Table 3-3 describes the test materials required to execute the required testing. Test materials are may not be fully tested during the campaign, but are used to support the tests conducted during the campaign. The following items listed may not be included in the baseline system or Scope of Certification document.

Table 3-3. Required Test Materials

Test Material	Quantity	Make	Model
Ballot on Demand Printer	1	OKI Data	C9650
ES&S Pens	20	BIC	Grip Roller
Ethernet Switch	1	Dell	HNC67M1

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2.3.3 Block Diagram

EVS 5.2.1.1 is an integrated suite of election management products. Figure 2-1 provides a visual system overview.

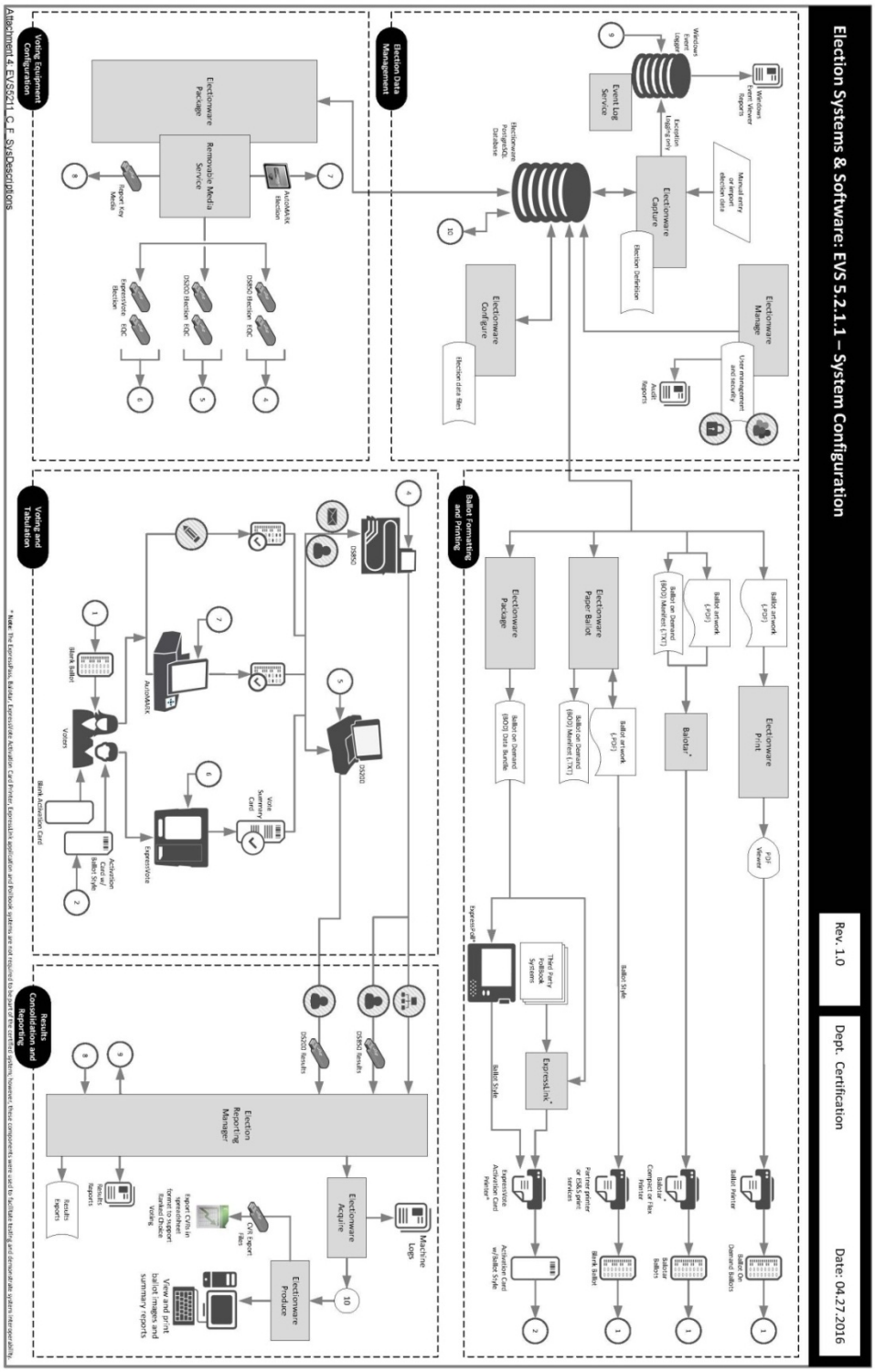

Figure 2-1. EVS 5.2.1.1 System Overview

2.3.4 Supported Languages

The submitted voting system supports English, Spanish, Chinese, Korean, Japanese, and Bengali.

2.3.5 NOCs

Applicable NOCs released by the EAC as of the date of the Test Plan are listed in Table 2-4.

Table 2-4. Applicable NOCs

NOC ID	Name
2016-02	Trusted Build
2016-01	Test Readiness Review

2.3.6 RFIs

Applicable RFIs released by the EAC as of the date of the Test Plan are listed in Table 2-5.

Table 2-5. Applicable RFIs

RFI ID	Name
2007-01	EAC Decision on Accessible Design
2007-03	EAC Decision on Summative Usability Testing
2008-03	EAC Decision on OS Configuration
2008-05	EAC Decision on Durability
2009-04	EAC Decision on Audit Log Events
2010-02	EAC Decision on Coding Conventions
2010-03	EAC Decision on Database Coding Conventions
2010-04	EAC Decision on Functional Requirements with Respect to Security
2010-05	EAC Decision on Testing of Modifications to a Certified System
2010-07	EAC Decision on Module Length Comments and responses
2010-08	EAC Decision on Calling Sequence
2012-03	EAC Decision on Configuration Management of COTS Products
2012-04	EAC Decision on Software Setup Validation
2013-03	EAC Decision on Timestamps
2013-04	EAC Decision on Usability Testing
2015-05	EAC Decision on Touchscreen Technology

3.0 TEST FINDINGS

The EVS 5.2.1.1, as identified in Section 2.3.2 of this report, was subjected to the tests as summarized in this section.

3.1 Anomalies

NTS Huntsville defines an anomaly as any unexpected result and/or event that deviates from what is standard, normal, or expected in which no root cause has been determined. All anomalies are logged and monitored throughout the test campaign and subsequent testing efforts. Anomalies may become deficiencies when a root cause is established.

Any anomaly identified during testing is described in Appendix C – Anomaly Report.

3.2 Deficiencies and Resolutions

NTS Huntsville defines a deficiency as any repeatable test result or event that is counter to the expected result or violates the specified requirements. Deficiencies are placed into the NTS deficiency tracking system (Jira) and the EAC's Virtual Review Tool (VRT) for disposition and resolution.

Any deficiencies identified during testing are summarized in the summary findings of the respective test section of the test report and their resolutions are presented in their entirety in Appendix B – Deficiency Report.

3.3 Summary Findings

Description of the test and findings are summarized in this section.

3.3.1 Physical Configuration Audit (PCA)

A Physical Configuration Audit (PCA) was performed as part of the testing activities in accordance with Section 6.6 of Volume II of the VVSG. The PCA compares the voting system components submitted for certification with the vendor's technical documentation and confirms that the documentation submitted meets the requirements of the Guidelines. The PCA included the following activities:

- Establishing a configuration baseline of software and hardware to be tested; confirm whether manufacturer's documentation is sufficient for the user to install, validate, operate, and maintain the voting system;
- Verifying software conforms to the manufacturer's specifications; inspect all records of manufacturer's release control system; if changes have been made to the baseline version, verify manufacturer's engineering and test data are for the software version submitted for certification;
- Reviewing drawings, specifications, technical data, and test data associated with system hardware, and to establish system baseline;
- Reviewing manufacturer's documents of user acceptance test procedures and data against system's functional specifications; resolve any discrepancy or inadequacy in manufacturer's plan or data prior to beginning system integration functional and performance tests;
- Subsequent changes to baseline software configuration made during testing, as well as system hardware changes that may produce a change in software operation are subject to re-examination.

Summary Findings

A PCA was performed to baseline the system's hardware and software components that were used during the test campaign. The submitted system matched the description provide in the TDP. No discrepancies were noted during the PCA.

3.3.2 Functional Configuration Audit (FCA)

A Functional Configuration Audit of the EVS 5.2.1.1 was performed in accordance with Section 6.7 of Volume II of the VVSG. The purpose of the FCA was to verify that the submitted modification listed in section 2.3.1 performed as documented in the manufacturer supplied technical documentation and to validate that the modifications met the requirements of the EAC 2005 VVSG. The FCA consisted of testing the following:

- The new Multi Column feature for ExpressVote
- That the tree view expansion indicator (+) functions properly
- That the ExpressVote can scan a properly formed 128c barcode
- That the new file name for the Cerberus users export works correctly

Summary Findings

The FCA demonstrated that the submitted modification performed as documented by the manufacturer and met the requirements 2005 VVSG Volume II Section 6.7.

3.3.3 Accessibility

The accessibility testing for EVS 5.2.1.1 was limited to ensuring that the new two column feature of ExpressVote meets the requirements of Volume I Section 3.2.2.2. Both hardware and software, along with any peripherals and documentation, was utilized by the tester to verify that the ballot navigation features of the ExpressVote function properly and allows voters with disabilities to successfully complete the voting process.

Summary Findings

Through accessibly testing, it was demonstrated that the system performed as documented with all components performing their intended functions and in addition meeting the requirements of Volume I Section 3.2.2.2.

3.3.4 System Integration

In order to further verify that submitted modifications did not negatively impact the system, one general, one closed primary and one open primary election were utilized across system components. The test decks for system integration included 128c barcodes to select ballot styles and ExpressVote generated ballots. The generated test deck was then utilized for system integration testing on the DS200 and DS850 with all expected results verified within ERM.

Summary Findings

Through System Integration testing, it was demonstrated that the system performed as documented with all components performing their intended functions and the requirements of system integration testing were met.

3.3.5 Security

Security testing was performed to verify compliance with the requirements defined in VVSG 2005 Volume I, Section 7. The range of risks tested was determined by the design of the system and potential exposure to risk. Since EVS 5.2.1.1 is a modification to a previously certified voting system, the security testing was limited to the following:

- Review for compliance to the submitted security checklists (or benchmarks) for the Windows Server 2008 R2 (Microsoft Secure Configuration Manger v 3.0 – Member Server) and Window 7 (USGCB v. 1.2).
- Basic vulnerability scans on the EMS components to verify that the Operating System and Anti-Virus software are up-to-date as of the test execution date and that no locally exploitable vulnerabilities are detected.

Summary Findings

Through security testing, it was demonstrated that the system is configured as documented and that the requirements of 2005 VVSG Volume I Section 7 were met.

3.3.6 TDP Review

The EVS 5.2.1.1 TDP was reviewed to the 2005 VVSG. This review was performed as part of the testing activities. The TDP review only included the revised and new documents submitted for this testing campaign. The documents were reviewed for accuracy, completeness, and compliance to the 2005 VVSG.

The review results were recorded in a worksheet that provided the pass/fail compliance to each applicable VVSG requirement. The discovered deficiencies were reported to the manufacturer and internally tracked by NTS Huntsville as test exceptions until verified that the applicable documents had been corrected. The manufacturer corrected nonconformance observations and resubmitted the associated documents for review. This process continued until the TDP complied with the applicable TDP standards in the EAC 2005 VVSG.

Summary Findings

There were no TDP deficiencies discovered during this test campaign.

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3.3.7 Source Code Review

All code modified or added subsequent to the EVS 5.2.1.0 source code reviews was reviewed as part of the 5.2.1.1 test campaign. This source code review was performed in accordance with the 2005 VVSG and EAC Testing and Certification Program Manual, Version 2.0.

Summary Findings

A total of 4,774 lines of code were reviewed for the EVS 5.2.1.1 test campaign. Twenty eight source code deficiencies were discovered during testing. All identified source code deficiencies were resolved prior to the conclusion of the source code review process. The deficiencies are summarized is in Table 3-1.

Table 3-1. Source Code Review Deficiencies

System Name	Deficiency (Type)	Deficiency (QTY)
Electionware	Line Too Long	15
	Non Enumerated Constant	11
	Object/Datatype/Variable Comments	1
ExpressVote	Inconsistent Indenting	1

3.3.8 Quality Assurance /Configuration Management

As part of the modification, NTS Huntsville personnel conducted a QA/CM review to verify that the manufacturer correctly followed their documented processes for a modified system. The QA/CM requirements were spot checked and limited to only the changes included within this modification. NTS Huntsville provided the manufacturer a quality assurance audit list in which the manufacturer was required to complete and deliver within 24 hours. The quality assurance audit utilized the following guidelines as the focus of the review:

The basis of this examination is to ensure:

- Conformance with the requirements to provide information on manufacturer practices required by the 2005 VVSG.
- Conformance of system documentation and other information provided by the manufacturer with the documented practices for quality assurance and configuration management.

The focus of this examination is to assess whether the manufacturer's quality assurance and configuration management program was followed for this modification. The goal of the review was to determine the following:

- Did the manufacturer follow their documented procedures for this modification?
- Was QA and/or Pre-Certification testing performed prior to submitting to the VSTL?
- Were the changes properly communicated to the affected jurisdictions and manufacturer staff?

Summary Findings

ES&S supplied NTS Huntsville with the requested documentation within the allotted 24-hour window. After a review of the information provided, NTS Huntsville determined that ES&S followed their established process for quality assurance and configuration management.

3.3.9 System Identification Tools

The manufacturer submitted system Identification tools are used by elections officials to verify that the hardware and software of systems purchased are identical to the systems certified by the EAC. Section 2.14 of the Voting System Test Laboratory Manual requires that VSTLs test system identification tools during the test campaign to make sure they function properly and as intended. The manufacturer submitted system identification tools were reviewed for compliance with the 2005 VVSG Volume I Section 7.4.6 and RFI 2012-04.

Summary Findings

NTS Huntsville used the results of the trusted build process and the EVS 5.2.1.1 system identification tools to verify that the tools provided for Electionware and ExpressVote function as described by ES&S. After a review of the information provided, NTS Huntsville determined that the system identification tools worked as documented and will allow for proper verification of the installed software for Electionware and ExpressVote. In addition NTS Huntsville determined that the tools meet the requirements of the Program Manual and Volume I Section 7.4.6 of the 2005 VVSG.

4.0 RECOMMENDATION FOR CERTIFICATION

NTS Huntsville performed conformance testing on the Election Systems & Software Voting System 5.2.1.1 to the EAC 2005 VVSG. NTS determined that the modifications met the requirements of the EAC 2005 VVSG and the manufacturer's technical documentation.

This report is valid only for the equipment identified in Section 2.0 of this report. Due to the varying requirements of individual jurisdictions, it is recommended by the EAC 2005 VVSG that local jurisdictions perform acceptance tests on all systems prior to implementation within their jurisdiction.

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APPENDIX A. ADDITIONAL FINDINGS

A.1 ADDITIONAL FINDINGS REPORT

The following tests were performed by NTS Huntsville at the request of the manufacturer. These modifications or additions represent functionality or tools that are outside the scope of the certification.

A.1.2 Election Support Software and Hardware

The following software and hardware components were used during certification test to support the operations of the EMS and ExpressVote:

- ExpressLink – ExpressLink is a Windows PC application that can run in either a standalone mode, or in a monitor mode, where the application monitors requests from a voter registration (VR) system over a shared network folder. The application imports an election definition from Electionware, accepts requests to print a voter's ExpressVote activation card, determines the voter's ballot style and then prints the activation card on the ExpressVote Activation Card Printer.
- ExpressVote Activation Card Printer – The ExpressVote Activation Card Printer is a small, thermal, on demand printer used to print the ballot activation code on the ExpressVote activation card.
- Electionware Toolbox – Electionware Toolbox is a set of utilities that can be integrated into the Electionware EMS to enhance the software usability experience and streamline various processes. These add-on utilities include Test Deck and Text to Speech.
- Ballot Online ExpressPass – Ballot Online is an optional system that allows a user to access online and make sample ballot selections on any device connected to the Internet. When finished, the output from this system is the ExpressPass – a selection summary with scannable QR code that the user can either print or save in an electronic format on their mobile device. If submitting the vote selections for official tabulation, the user is required to go to the polling place to submit the vote selections on their ExpressPass, following standard voter authentication at the polling place. The voter operates the ExpressVote Vote Capture to scan, review and validate vote selections. The vote summary card may then be submitted for tabulation on an ES&S tabulator: DS200 or DS850.

NTS Huntsville performed limited testing as requested by the manufacturer. Table A-1 outlines the requested testing.

Table A-1. Manufacturer Requested Testing Outside of Certification

Component	Version	Requested Testing
ExpressLink	1.3.0.0	2005 VVSG Source code Compliance, Functional Integration Test
ExpressVote Activation Card Printer	N/A	Functional Integration Test
Electionware Toolbox	2.4.0.0	Functional Integration Test
Ballot Online ExpressPass	N/A	Functional Integration Test

A.1.3 Summary Findings

The limited testing by NTS determined that the components listed in Table A-1 functioned as described and did not introduce any errors into the certified system. In addition, the ExpressLink Software was found to comply with the source code requirements of the 2005 VVSG.

APPENDIX B. DEFICIENCY REPORT

B.1 DEFICIENCY REPORT

No deficiencies were discovered during the EVS 5.2.1.1 test campaign.

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APPENDIX C. ANOMALY REPORT

C.1 ANOMALY REPORT

No anomalies were discovered during the EVS 5.2.1.1 test campaign.

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APPENDIX D. AS-RUN TEST PLAN

D.1 AS-RUN TEST PLAN

Table D-1 details the change made to the test plan during the course of testing. For a complete description see NTS Test Plan PR046387-01 Rev C.

Table D-1. As-Run Test Plan Changes

Test Plan Section	Description of Change	Justification
3.2	Added the OKI 431d to the COTS hardware list	ES&S submitted a hardware substitute for the DS850 report printer. The OKI B431d is functionally equivalent to the previously certified OKI B431dn.

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APPENDIX E. TECHNICAL DATA PACKAGE

E.1 EVS 5.2.1.1 TECHNICAL DATA PACKAGE

The documents listed in Table E-1 comprise the EVS 5.2.1.1 TDP.

Table E-1. EVS 5.2.1.1 TDP

EVS 5.2.1.1 TDP Documents	Version	Doc No.	Document Code
System Overview			
Voting System Overview	1.1	01-01	EVS5211_C_D_0100_SysOvr
System Functionality Description			
System Functionality Description	1.1	02-01	EVS5211_C_D_0200_SFD
System Hardware Specification			
AutoMARK System Hardware Overview	8	03-01	AutoMARK_System_Hardware_Overview_AQS-18-5002-000-S
AutoMARK System Hardware Specification	6	03-02	AutoMARK_System Hardware Specification_AQS-18-5000-001-F
System Hardware Specification – DS200 HW Rev 1.2	3.0	03-03	DS200HW_M_SPC_0312_HWSpec
System Hardware Specification – DS200 HW Rev 1.3	4.0	03-04	DS200HW_M_SPC_0313_HWSpec
System Hardware Specification – DS850 HW Rev 1.0	1.2	03-05	DS850HW_M_SPC_0310_HWSpec
System Hardware Specification – ExpressVote HW Rev 1.0	3.4	03-06	ExpressVoteHW_M_SPC_0310_HWSpec
Software Design and Specification			
ES&S Coding Standards	3.0	04-01	ESSSYS_D_P_0400_CodingStandards
ES&S System Development Program	2.0	04-02	ESSSYS_SG_P_0400_SystemDevProgram
Software Design Specifications DS200	1.0	04-03	EVS5211_D_SDS00_DS200
Software Design Specifications DS850	1.0	04-04	EVS5211_D_SDS00_DS850
Software Design Specifications Electionware	1.0	04-05	EVS5211_D_SDS00_ElectionWare
Software Design and Specification – ELS	1.0	04-06	EVS5211_D_SDS00_ELS
Software Design and Specification – ERM	1.0	04-07	EVS5211_D_SDS00_ERM
Software Design and Specification – ERM Appendices	1.0	04-08	EVS5211_D_SDS00_ERM01_Appendices
Software Design and Specification – ExpressVote	1.1	04-09	EVS5211_D_SDS00_ExpressVote
AutoMark Software Design and Specifications	--	04-02	01_AutoMARK Software Design and Specification (Folder)
AutoMARK Ballot Image Processing Specifications	6	04-02-01	AutoMARK ESS Ballot Image Processing Specification AQS-18-5002-003-S
AutoMARK Ballot Scanning and Printing Specification	5	04-02-02	AutoMARK ESS Ballot Scanning and Printing Specification AQS-18-5002-007-S
AutoMARK Driver API Specification	5	04-02-03	AutoMARK ESS Driver API Specification AQS-18-5000-002-F
AutoMARK Embedded Database Interface Specifications	5	04-02-04	AutoMARK ESS Embedded Database Interface Specifications AQS-18-5002-005-S
AutoMARK GUI Design Specifications	6	04-02-05	AutoMARK ESS GUI Design Specifications AQS-18-5001-005-R
AutoMARK Operating Software Design Specifications	5	04-02-06	AutoMARK ESS Operating Software Design Specifications AQS-18-5001-002-R
AutoMARK Operations and Diagnostic Log Specifications	5	04-02-07	AutoMARK Operations and Diagnostic Log Specs AQS-18-5002-004-S
AutoMARK Programming Specifications Details	5	04-02-08	AutoMARK ESS Programming Specifications Details AQS-18-5001-011-R
AutoMARK Software Design Specifications	5	04-02-09	AutoMARK ESS Software Design Specs AQS-18-5001-004-S
AutoMARK Software Design Specification Overview	N/A	04-02-10	AutoMARK ESS Software Design Spec Overview

E.1 EVS 5.2.1.1 TECHNICAL DATA PACKAGE (CONTINUED)

Table E-1. EVS 5.2.1.1 TDP (Continued)

EVS 5.2.1.1 TDP Documents	Version	Doc No.	Document Code
AutoMARK Software Development Environment	5	04-02-11	AutoMARK ESS Software Development Environment AQS-18-5001-006-R
AutoMARK Software Diagnostics Specifications	5	04-02-12	AutoMARK ESS Software Diagnostics Specifications AQS-18-5000-004-F
AutoMARK Software Standards Specification	5	04-02-13	AutoMARK ESS Software Standards Specification AQS-18-4000-000-S
Electionware PostgreSQL Table and Field Descriptions	--	04-03	EVS5211_D_SDS00_ElectionWare04_PostgreSQL Table and Field Descriptions (Folder)
Readme Election_ware_4_7_1_2	--	04-03-01	Election_ware_4_7_1_2
Readme Election_ware_admin_4_7_1_2	--	04-03-02	Election_ware_admin_4_7_1_2
System Test/Verification Specification			
Voting System Test Plan ES&S Voting System 5.2.1.1	1.0	05-01	EVS5211_QA_D_0500_SysTestPlan
Usability Test	--	05-02	Usability Test Reports (folder)
Common Industry Format Usability Test Report – AutoMARK (VAT)	1.0	05-02-01	AMVATHW_P_D_0510_CIFRptAMVAT
CIF Usability Test Report – DS200	1.2.1	05-02-02	DS200HW_P_D_0512_CIFRptDS200
CIF Usability Test Report – ExpressVote	N/A	05-02-03	ExpressVoteHW_P_D_0509_ CIFRptExpressVote
System Security Specification			
AutoMARK System Security Specification	7	06-01	AutoMARK ESS System Security Specification AQS-18-5002-001-S
EMS Client Workstation Secure Setup & Configuration Guide	1.0	06-02	ESSSYS_5'2'1'1_SPC_ClientWorkstationSetupConfigGuide
EMS Server Secure Setup & Configuration Guide	1.0	06-03	ESSSYS_5'2'1'1_SPC_EMSServerSetupConfigGuide
Standalone EMS Workstation Secure Setup & Configuration Guide	1.0	06-04	ESSSYS_5'2'1'1_SPCStandaloneWorkstationSetupConfigGuide
System Security Specification	1.0	06-05	EVS5211_CM_SPC00_SysSecuritySpec
Security Script Description	1.0	06-06	EVS5211_CM_SPC02_SecScriptDesc
System Operations Procedure			
ExpressVote Operator's Guide Appendices	1.0	07-01	EVS5211_DOC_APPX_ExpressVote
System Operations Procedures – AutoMARK	1.0	07-02	EVS5211_DOC_SOP_AMVAT
System Operations Procedures – DS200	1.1	07-03	EVS5211_DOC_SOP_DS200
System Operations Procedures – DS850	1.0	07-04	EVS5211_DOC_SOP_DS850
System Operations Procedures – Event Log Service	1.0	07-05	EVS5211_DOC_SOP_ELS
System Operations Procedures – Election Reporting Manager	1.1	07-06	EVS5211_DOC_SOP_ERM
Electionware Administrator's Guide	1.0	07-07	EVS5211_DOC_SOP_EW01Admin
Electionware Define: User's Guide	1.0	07-08	EVS5211_DOC_SOP_EW02Define
Electionware Design: User's Guide	1.0	07-09	EVS5211_DOC_SOP_EW03Design
Electionware Deliver: User's Guide	1.0	07-10	EVS5211_DOC_SOP_EW04Deliver
Electionware Results: User's Guide	1.1	07-11	EVS5211_DOC_SOP_EW05Results
System Operations Procedures – ExpressLink	1.0	07-12	EVS5211_DOC_SOP_ExpressLink
System Operations Procedures – ExpressVote	1.0	07-13	EVS5211_DOC_SOP_ExpressVote

E.1 EVS 5.2.1.1 TECHNICAL DATA PACKAGE (CONTINUED)

Table E-1. EVS 5.2.1.1 TDP

EVS 5.2.1.1 TDP Documents	Version	Doc No.	Document Code
System Maintenance Manuals			
System Maintenance Manual – ES&S AutoMARK	1.0	08-1	EVS5211_DOC_SMM_AMVAT
System Maintenance Manual – ES&S DS200	1.0	08-2	EVS5211_DOC_SMM_DS200
System Maintenance Manual – ES&S DS850	1.0	08-3	EVS5211_DOC_SMM_DS850
System Maintenance Manual – ES&S ExpressVote	1.0	08-4	EVS5211_DOC_SMM_ExpressVote
Personnel Deployment and Training			
Personnel Deployment and Training Program	3.0	09-01	ESSSYS_T_D_0900_TrainingProgram
Configuration Management Plan			
Configuration Management Program	2.1	10-1	ESSSYS_CM_P_1000_CMProgram
Technical Documentation Program	5.0	10-2	ESSSYS_DOC_P_1000_TDProgram
QA Program			
Manufacturing Quality Assurance Plan	2.0	11-01	ESSSYS_M_P_1100 _MNFQualityAssurancePlan
Software Quality Assurance Program	2.0	11-02	ESSSYS_QA_P_1100 _SoftwareQualityAssuranceProgram
Software/Firmware Acceptance	2.0	11-03	ESSSYS_QA_L_1100 _SoftwareFirmwareAcceptance
Acceptance Checklists	--	11-02	Acceptance Checklists (folder)
ES&S 1.3 Hardware DS200 Acceptance Checklist	A	11-02-01	1 3 Hardware DS200_AccptChklst_001RevA
DS850 Acceptance Checklist	D	11-02-02	850_AccptChklst_revD
DS850 Onsite Acceptance Checklist	B	11-02-03	850_OAccptChklst_revB
AutoMARK VAT Acceptance Checklist	A	11-02-04	AutoMark_AccptChklst_001Rev.A
AutoMARK QC Checklist	A	11-02-05	AutoMark_QC_Chklst_001Rev.A
ES&S DS200 Acceptance Checklist	D	11-02-06	DS200_ AccptChklst_001RevD
ES&S ExpressVote Acceptance Checklist	B	11-02-07	ExpressVote_ AccptChklst_001Rev B
System Change Notes			
System Change Notes	1.1	12-01	EVS5211_DOC_D_1200_ChangeNotes
System Change Notes	1.0	12-02	EVS5211_DOC_D_1200_ChangeNotes_QA
Other TDP Documents			
ES&S Ballot Production Handbook	2.3	13-01	BPG_2'3_SOP

END OF TEST REPORT